WINPOWER

INSTRUCTION MANUAL

MODELS

CD2500
CD4400E
CD5500E
CD5500ES

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I. INTRODUCTION

Thank you for purchasing a Pierce Company Winpower alternator. This manual covers the operation and maintenance of models CD2500, CD4400E, CD5500E and CD5500ES. This manual is based upon the latest product information available at the time of printing.

The Pierce Company, Inc. reserves the right to make changes at any time without notice and without incurring any obligation.

WARNING! Indicates a strong possibility that severe personal injury, loss of life, or a serious hazard condition could occur if instructions given in this manual are not followed.

CAUTION! Indicates a possibility that personal injury, equipment damage, or other property damage could occur if the instructions are not followed.

NOTE: Lists helpful information which should assist you in getting satisfactory performance with your new alternator.

If you have a problem with your alternator, or have any questions about the alternator, consult an authorized Winpower distributor, dealer, or service center. Should you require additional information, please consult the factory service department,

The Winpower alternator is designed to give safe and dependable service if operated according to the instructions given in this manual. Read and understand the owner's operation and service manual before operating the alternator. Failure to do so could result in personal injury.

II. PRECAUTIONS FOR SAFE USE

A. To avoid fires:

1. **WARNING!** Do not store combustible material such as straw, waste paper, scrap wool, etc. where the alternator is to be stored.

2. **WARNING!** Do not store dangerous or flammable materials such as lubricants, celluloid, gasoline, explosives, etc. near the alternator.

3. **WARNING!** Operate the alternator on a level surface. If the alternator is tilted or moved during use, there is the danger of fuel spillage and/or a chance the alternator will overturn.

4. **CAUTION!** During operation, maintain a safe distance of at least three feet (one meter) from buildings or other equipment. When an alternator is located too close to a building or other equipment, the heat and exhaust from the engine will cause the surrounding air temperature to rise. This will reduce the alternator's cooling capability and could cause the engine or alternator to overheat.

5. **CAUTION!** Do not enclose the alternator, install in a recreational vehicle, or cover with a structure, because this will cause it to overheat creating a possible equipment damaging condition.

6. **WARNING!** Always stop the engine when refueling due to the extreme danger that fuel vapor or spilled fuel may be ignited.

7. **CAUTION!** Be careful not to spill fuel when refueling. If fuel is spilled, completely wipe up and let dry before starting the engine.

8. **CAUTION!** Do not overfill the fuel tank.

9. **WARNING!** Never refuel in the presence of a lighted cigarette or an open fire.

10. **WARNING!** Never refuel a hot engine. Always allow the engine to cool before refueling.

B. Exhaust gases:

1. **WARNING!** Do not operate the alternator in locations with poor ventilation such as home interiors, warehouses, tunnels, wells, pits, tanks, ship holds, etc. Fatal levels of gaseous fumes can accumulate in poorly ventilated areas and increase the danger of carbon monoxide poisoning. Always pay strict attention to the fire codes, building codes, and safety regulations if the alternator is operated inside a building.

2. **WARNING!** Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defect, or other reproductive harm.

C. Other precautions:

1. **WARNING!** Do not operate the alternator with wet hands, severe electrical shock may occur. Do not operate in the rain or snow.

2. **CAUTION!** Do not touch the muffler during operation or just after stopping, a serious burn could result. The exhaust system operates at a very high temperature.

3. **CAUTION!** Do not get water on the alternator. If the unit becomes wet, allow it to completely dry before operating. Also, a wet spark plug may prevent the engine from starting.

4. **CAUTION!** Do not connect the alternator to the household electrical system without using a U.L. listed, and/or CSA approved, double throw disconnect switch. Any such installation should be made only by a licensed electrician in accordance with all city, county, province, state, regional, and national electrical codes.

5. **CAUTION!** If you should notice an abnormal noise, odor, vibration, etc. when the unit is operating, it should be stopped immediately and the reason for the condition determined. Failure to do so could permanently damage the unit as well as associated equipment. If the cause cannot be determined, the unit should be taken to the nearest service center for proper diagnosis.

6. **WARNING!** Make sure that the unit is grounded properly and in accordance with all applicable regulating codes.

III. PRESTART PROCEDURES

A. Check the engine oil level:

1. **CAUTION!** Remove the oil filler cap to check the oil level. If the oil level is low, add a high quality motor oil to the point of overflowing.

2. **CAUTION!** Engine oil is a major factor affecting engine performance and service life. Use only recommended types and grades of lubrication oil(see engine manual for manufacturer's recommendation). If your engine manual has been misplaced, then the following is recommended:

CD4400E, CD5500E, CD5500ES		CD2500	
Summer	SAE #20-30	Summer	SAE #10W-30
Winter	SAE #10W-30	Winter	SAE #5W-30

3. **CAUTION!** The engine is shipped WITHOUT oil. Use a high quality detergent oil classified "For service SF, SE, SD, or SC". Detergent oils keep the engine cleaner and retard the formation of gum and varnish deposits. Use 4 stroke oil, do not use 2 stroke oil.

Oil capacity: CD4400E, CD5500E, CD5500ES - 3 Pints(1.42 liters)
CD2500 1 1/4 Pints(0.59 liters)

4. **CAUTION!** Running the engine with insufficient oil can cause serious engine damage.

B. Fueling the engine:

The engine manufacturer recommends the use of clean, fresh, lead-free gasoline. Leaded gasoline may be used if lead-free is not available. The use of lead-free gasoline results in fewer combustion deposits and longer valve life. If long-term storage is expected, a fuel stabilizer (such as STA-BIL) should be used to eliminate the formation of fuel gum deposits in the fuel system.

Fuel Capacity: CD4400E, CD5500E. CD5500ES - 6.0 Gallons(22.7 liters)
CD2500 - 3.5 Gallons(13.25 liters)

When refueling, the following steps are recommended:

1. **WARNING!** Always stop the engine.

2. **CAUTION!** Disconnect and ground the spark plug lead wire.

3. **NOTE:** Close the fuel valve at the base of the fuel tank

4. **NOTE:** Check the fuel strainer. Never operate without a fuel strainer.

5. **CAUTION!** Always wipe up all spilled fuel.

6. **NOTE:** Replace spark plug lead wire.

7. **NOTE:** Open the fuel valve.

8. **NOTE:** Ensure the circuit breakers are in the pushed in or "Reset" position.

9. **WARNING!** Before starting, disconnect all power cords from the AC receptacles on the alternator panel.

10. **WARNING!** The alternator may be hard to start if a load is connected. It is dangerous if electric tools are powered during start up. This could result in personal injury.

IV. ENGINE STARTING/STOPPING

A. Engine Starting (manual):

1. Check oil and fuel levels.

2. Make sure the appliance is disconnected.

3. Move engine Choke-A-Matic control as far forward as possible toward "Choke" or "Start" position. (When the engine is warm or the temperature is high, start the engine with the choke in the run position.)

4. Place the engine stop switch in the "On" position, if applicable.

5. Grasp the starter grip and pull on the rope until you feel the maximum resistance. Allow the rope to recoil to its original position, then pull it again vigorously.

6. When the engine starts, open choke gradually. If the engine does not start, review the status of the fuel supply and oil level. The CD4400E, CD5500E and CD5500ES are equipped with a low oil level shutdown device. If the oil level is low, this device will not allow the engine to start. The red annunciator light will blink during the attempt to start the engine.

B. Engine Starting (electrical):

CD5500ES only

1. With the choke fully closed, press firmly on the "Stop-Run-Start" switch pushing into the momentary "Start" position. Never crank for more than 5 second intervals, and allow 20 second rest cycles between crank cycles. Never crank the engine more than 5 cycles. If the engine does not start, review the status of the fuel supply and oil level. These units are equipped with a low oil level shutdown. If the oil level is low this device will not allow the engine to start. The red annunciator light will blink during the attempt to start the engine. If both are satisfactory, then review the engine manual for additional information.

2. When the engine starts, open choke gradually.

C. Engine stopping:

1. Remove all electrical load by disconnecting all power cords from the alternator panel.

2. Ensure the Economizer switch is in the "Off" position, if applicable.

3. Place the "Stop-Run" switch at the "Stop" position for the CD4400E, CD5500E and CD5500ES models. Push the piercing shorting bar against the spark plug boot on the CD2500.

V. ECONOMIZER

Models CD4400E, CD5500E and CD5500ES

The economizer operates as an idling device which will sense the generator load and slow the engine speed down when a generator no-load condition exists. This is to save fuel, create less engine noise, and reduce wear and tear on the engine when the generator is not required to supply power on an intermittent basis. If the generator will be unloaded for extended periods of time, the engine should be shut off.

The economizer switch on the side panel controls this device. With the switch in the "Off" position, the engine runs at rated speed continuously. The switch should be in the "Off" position when starting or stopping the engine. During starting, allow the engine to run for five minutes before using the Economizer. This will allow the engine to warm up so that is runs smoothly at the lower speed as well as ensure proper engine lubrication. The proper idled-down engine speed is 2300 RPM.

VI. OPERATION

A. The electrical generator is comprised of a rotating magnetic field winding that is bolted to the engine output shaft and is situated in the center of a set of stationary windings which provide the electrical power output. The generator is totally brushless which means there is not a physical connection between these rotating and non-rotating components. The only wear item in the generator is the rear anti-friction, sealed ball bearing which requires no maintenance. However, it should be replaced after 10,000 hours of operation.

The excitation system is a static auxiliary winding connected to a capacitor which is very sensitive to armature reaction. The rotating diodes connected to the field windings rectify this excitation current which is a series of current pulses to create the necessary magnetic field.

The generator output is very sensitive to engine speed as far as a proper output voltage is concerned. The design no-load speed is 3720 RPM or a frequency of 62 Hz. This has been factory set and should perform satisfactorily. However, in the event engine maintenance has been performed, ensure the engine speed is adjusted in accordance with the engine manual.

B. After the engine has been started, the generator is ready for loading. The available load can now be plugged into the appropriate receptacle.

WARNING! Ensure the load to be plugged into the receptacle is turned to "Off" at its control switch. Never energize a load by plugging it into a generator receptacle. Energize the load by turning its control switch "On" subsequent to plugging into a receptacle.

C. **CAUTION!** When the 120 VAC receptacles are utilized, ensure that the load applied does not exceed one-half (1/2) the nameplate rating of generator output.

If various 120 VAC loads are applied, they can be plugged into several of the accessible outlets for load balancing and to utilize all the available generator output power.

D. The generator windings are protected from overloading by circuit breakers. Should overloading occur, the circuit breaker will interrupt the overcurrent condition by disconnecting the winding from the load. This will be visually indicated by an extending of the "push to reset" buttons out beyond their normal length. To reset the circuit breaker–allow a few minutes for the circuit breaker to cool down, then push the circuit breaker in until it seats into its original position.

CAUTION! Never energize the load by resetting the circuit breaker. Always disconnect the load before the circuit breaker is "reset".

VII. MAINTENANCE

Before start-up, perform the following routine maintenance items.

1. Check fuel supply.
2. Check engine oil level; if not full, add as required. If at service interval, start engine to warm oil; drain and replace.
3. Check air cleaner; service if required.
4. Inspect for loose bolts and screws. Re-tighten all loose items. Replace all missing or broken items. Inspect for broken receptacles; replace broken items.
5. Inspect for fuel and oil leaks. Service as required to stop leakage.
6. Start unit and check for abnormal noise and vibrations. Correct any abnormal condition.
7. Inspect exhaust system.
8. Ensure the generator cooling slots are clear for proper ventilation.

Refer to the engine manual for the manufacturer's recommended engine maintenance procedures.

To ensure reliable starting, start and run the unit periodically to minimize carburetor clogging and fuel varnishing. When the engine will be stored for long periods of time without exercising drain all fuel from the carburetor and fuel system.

VIII. TROUBLE SHOOTING

A. Mechanical

Should an engine difficulty arise to necessitate adjustment, see the adjustment section of the engine operation and maintenance instructions provided. Should service be required, see the service and repair information section for details.

B. Electrical

TROUBLE SHOOTING CHART

PROBLEM	CAUSE	DISPOSITION
Low or no generator output voltage	1. Engine operating speed is too low.	Increase engine no load speed to 3720RPM or 62Hz.
	2. Circuit breakers have opened due to overload.	Remove load and reset circuit breakers.
	3. Generator output lead has been disconnected from the circuit breaker or receptacle.	Remove generator end panel and inspect for and reconnect leads.
	4. Rotor thru-bolt has loosened and rotor shaft has backed off of engine shaft male taper.	Inspect tapers for damage replace component if necessary, re-torque rotor thru-bolt.
	5. Capacitor is defective (See Capacitor Testing).	Replace capacitor.
	6. Winding failure; main winding, auxiliary winding or rotor winding has opened or shorted (See Winding Testing).	Determine defective winding and replace.
Generator output voltage is too high.	1. Engine operating speed is too high.	Decrease engine no load speed to 3720RPM or 62Hz.
Engine speed and generator output decrease substantially when loaded.	1. Generator is overloaded.	Reduce load to a level below nameplate rating.
	2. Engine governor is out of adjustment or malfunctioning.	Reference service and repair information in operation and maintenance instructions.

C. Capacitor Testing:

A capacitor is an electrical device which stores electrical energy. A simple test can be made to determine if the capacitor is functional. Set the ohmmeter to read a high resistance and connect test leads across the capacitor leads with capacitor leads disconnected. Note the reading on the ohmmeter. If the capacitor is shorted, you will read zero resistance. If the capacitor is good, the meter will point momentarily to a low value and then fall back to a high value resistance.

D. Winding Testing:

The primary winding faults that normally occur are winding to winding short circuits and winding to ground short circuits. When these faults occur they can usually be detected by an ohmmeter. The first check for winding failure is a visual inspection for burned winding conductors. If there is no evidence of this, then the following checks can be performed.

1. Main Windings
   These are the windings which are terminated by BLACK leads with 1, 2, 3, and 4 tag designations.
   Measure resistance between leads 1, 3, and ground, as well as between 2 and 4. All of these measurements must be very high resistances; near infinity or off scale range.

2. Auxiliary Windings
   These windings are terminated at the capacitor. Disconnect these conductors from the capacitor, and measure between winding lead and ground. Also, measure resistance between the capacitor winding lead and the main windings. All of these measurements must be very high resistances; near infinity or off scale range.

3. Rotor Windings
   These windings are terminated at the diode circuit. Measure resistance between one connection point and the rotor shaft on each circuit board or disc. The measurement must be very high resistance; near infinity or off scale range.

Resistances of the Generator Windings

WINDING RESISTANCE CHART

	MAIN WINDING	AUXILIARY WINDING	ROTOR WINDING
CD2500			
CD4400E			
CD5500E			
CD5500ES			

IX. LIMITED WARRANTY

The Pierce Company, Inc., Generator Division, hereby warrants for one year the Alternator Set described herein to be free from defects in material and workmanship if properly installed, serviced and operated under normal conditions according to our instructions.

This warranty covers parts and labor and is extended to the original purchaser for a period of one year(365 days) from the date of purchase. During that period, The Pierce Company, Inc., Generator Division, will replace, free of charge, upon examination by the factory, or an authorized service center, any part or parts found to be defective in material or workmanship.

This warranty does not obligate the manufacturer to bear any transportation charges in connection with the replacement or repair of defective parts or delivery of the defective alternator set. This warranty does not cover rental charges for replacements while defective unit is being repaired. The replacement of parts and/or service arising out of abuse, neglect, or normal wear and tear is not covered by this warranty.

The Pierce Company, Inc., Generator Division, hereby disclaims any and all implied warranties, including but not limited to, warranties of merchantability and fitness for any, if and to the extent that such disclaimer is not forbidden by any applicable law. Implied warranties, including but not limited to, warranties of merchantability and fitness for any particular purpose which The Pierce Company, Inc. is so forbidden to disclaim by any applicable law, are warranted one year from the date of purchase.

This is the Purchaser's sole and exclusive remedy hereunder. Liability for consequential, incidental or special damages and/or expenses under any and all warranties are excluded to the extent exclusion is permitted by law.

All applications for warranty must have the model and serial number of the unit for which the application(s) is being filed, customer's name, address, phone number, and date of sale; otherwise, the warranty/application and payment may be rejected or delayed.

X. EXCLUSIONS TO WARRANTY

The Alternator Set is equipped with an engine which is not covered by this warranty. The engine is covered exclusively by the engine manufacturer's warranty presented in the enclosed engine manual.

The Alternator Set is intended to be used as constructed by the factory. Any modifications to the assembly, such as conversion to LP gas fuel will void the warranty. The Pierce Company, Inc., Generator Division, does not warrant any modifications to the unit.